

**EXAMPLE COMPLIANCE ASSURANCE MONITORING PLAN:  
WET SCRUBBER FOR PM CONTROL**

**I. Background**

**A. Emissions Unit**

Description:	Dry dryers, 1-4
Identification:	401, 403, 406, 407
Facility:	Facility H Anytown, USA

**B. Applicable Regulation, Emission Limit, and Pre-CAM Monitoring Requirements**

Regulation:	Permit; OAR 340-21
CAM Emission limits:	Particulate matter: 0.2 gr/dscf (3 hour average)
Pre-CAM monitoring requirements:	Annual Method 9

**C. Control Technology, Capture System, Bypass, PTE**

Controls:	Wet scrubber
Capture System:	Closed-duct system
Bypass:	The dryer exhaust will only bypass its associated scrubber if the scrubber is shut down for maintenance while the process is operating. These periods are documented and reported.
PTE before controls:	2730 TPY (Based on initial performance tests which showed an average removal efficiency of 97%)
PTE after controls:	82 TPY

**II. Monitoring Approach**

The key elements of the monitoring approach are presented in the attached table. Normal process operations will not produce conditions that adversely affect the scrubbers without affecting scrubber exhaust temperature; therefore, no process operational parameters will be monitored.

**III. Response to Excursion**

- A. Excursion of scrubber exhaust temperature ranges will trigger immediate notification to maintenance personnel. Maintenance personnel will inspect the scrubber within 4 hours of receiving notification and make needed repairs as soon as practicable.
- Significant holes or damage to the scrubber water filter will result in replacing the filter immediately. If there is excess buildup of particulate on the filter, operations personnel will determine if blowdown should be increased and document their decision and actions.
- B. QIP Threshold: Six temperature excursions in a 6-month reporting period. (Note: Proposing a QIP threshold in the CAM submittal is not required.)

MONITORING APPROACH: Facility H Scrubbers 401, 403, 406, 407

	Indicator No. 1	Indicator No. 2
I. Indicator	Wet scrubber exhaust temperature.	Scrubber water filter condition.
Measurement Approach	Temperature is measured with a thermocouple at the exhaust of the scrubber.	When the scrubber is shut down for weekly maintenance, the scrubber water filter is inspected and cleaned.
II. Indicator Range	Temperature greater than 150° F for a six-minute average period.	Holes or other damage. Excess buildup of particulate.
III. Performance Criteria		
A. Data Representativeness <sup>a</sup>	The thermocouple is located at the exhaust of the scrubber. It has a minimum accuracy of $\pm 4^{\circ}$ F or $\pm 75\%$ , whichever is greater.	NA
B. Verification of Operational Status	NA	NA
C. QA/QC Practices and Criteria	Thermocouple calibrated annually.	NA
D. Monitoring Frequency	Temperature is measured continuously.	Filter is inspected and cleaned weekly.
Data Collection Procedures	Temperature is recorded as a 6-minute average by the DAS.	Maintenance records.
Averaging period	6 minutes	NA

<sup>a</sup>Values listed for accuracy specifications are specific to this example and are not intended to provide the criteria for this type of measurement device in general.

## JUSTIFICATION

### I. Background

The pollutant-specific emission units are the four dry dyers (finish dryers) which dry wood chips. The dryers are Heil three pass horizontal rotary drum dryers, and burn natural gas or distillate fuel oil or receive heat indirectly from the boilers via steam. Dryers No.1 and No. 2 are face material dryers; dryers No. 3 and No. 4 are core material dryers. The main wood species dried is Douglas fir. Wood entering the dryers may range from 10 to 20 percent moisture and exit with 4 to 6 percent moisture prior to particleboard production. The dryer exhaust streams are controlled by American Air Filter wet scrubbers. The scrubber water is filtered and recycled.

### II. Rationale for Selection of Performance Indicators

The scrubber exhaust gas temperature was selected because it is indicative of scrubber operation and adequate water flow. When the water flow rate is sufficient, contact between the exhaust gas and the scrubber water causes the temperature of the exhaust gas to drop. The temperature range of the exhaust gas stream during normal operation was determined. With the scrubber water off, the scrubber exhaust is approximately 30°F hotter than normal. When the dryers and scrubbers are shut down for maintenance or cleaning, the temperatures drop.

The scrubber water is filtered and recycled, with a fixed amount of blowdown and makeup water. Checking the filter ensures particulate is being removed from the recycled water. Excess particulate in the scrubber water will reduce control efficiency. Any holes or degradation of the filter will be discovered during the weekly inspection.

### III. Rationale for Selection of Indicator Ranges

The level for the exhaust temperature was selected based upon the data obtained during normal scrubber operation and the most recent performance test. Examination of operating data show that the scrubber outlet temperature increases slightly as the ambient temperature increases during the year. During normal operation, outlet temperatures approach 150°F during the summer months, and this value was selected as the upper indicator level. No lower indicator level is necessary.

The most recent performance test using compliance test methods (Reference Method 1-4 and 5 for particulate) was conducted at this facility on April 9-11, 1996. Three test runs were conducted on each of the four dry dryers. During testing, the measured PM emissions ranged from 0.024 to 0.054 gr/dscf. During source testing, the scrubber exhaust gas temperatures ranged from 98° to 128°F, and dry dryer scrubber exhausts were found to be well below the compliance limit for particulate emissions. Dryer exhaust temperatures ranged from 149° to 162°F, 30 to 40 degrees hotter than the scrubber exhaust. During the emissions tests, the scrubber exhaust gas temperatures were measure continuously, and 6-minute averages were charted. The complete test results are documented in the test report dated April 1996. During the performance test, the measured particulate emissions were well under the emission limitation of 0.2 gr/dscf.

Three months of operating data (October through December 1996) were reviewed, which include dry dryer scrubber temperature alarm data, maintenance log book entries, and temperature graphs for those days on which alarms occurred. The scrubber temperature alarm was activated on 4 days out of the 3-month operating period for which data was collected. One alarm was caused due to a data processor malfunction, while the others were caused by lack of water flow to the scrubber or excess temperature during shutdown.

Based on the performance test data and a review of historical data, the selected QIP threshold for the wet scrubber exhaust gas temperature is six excursions in a 6-month reporting period. This level is less than 1 percent of the scrubber operating time. If the QIP threshold is exceeded in a semiannual reporting period, a QIP will be developed and implemented. (Note: Establishing a proposed QIP threshold in the monitoring submittal is optional).